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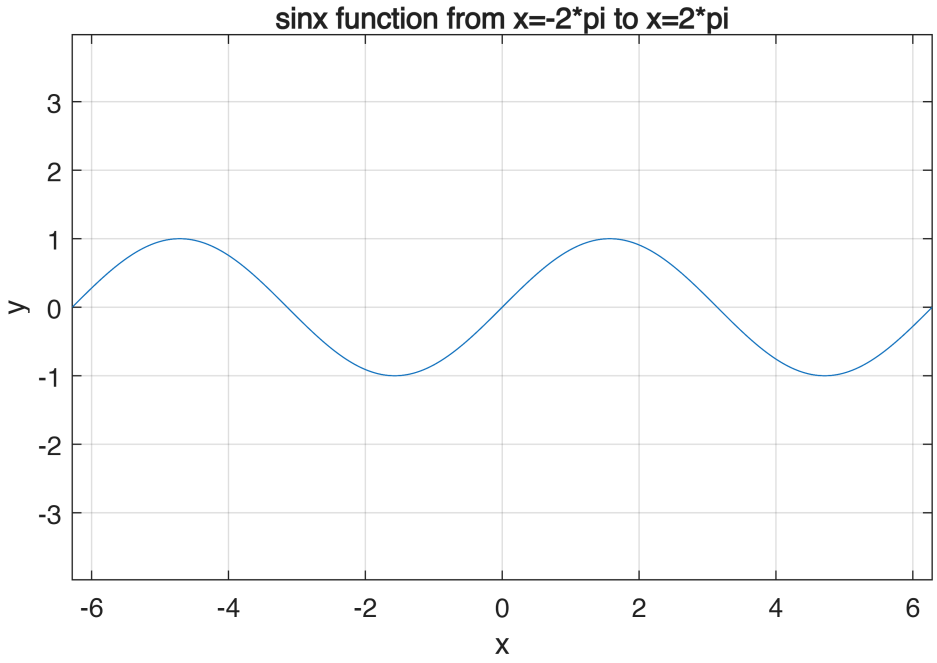
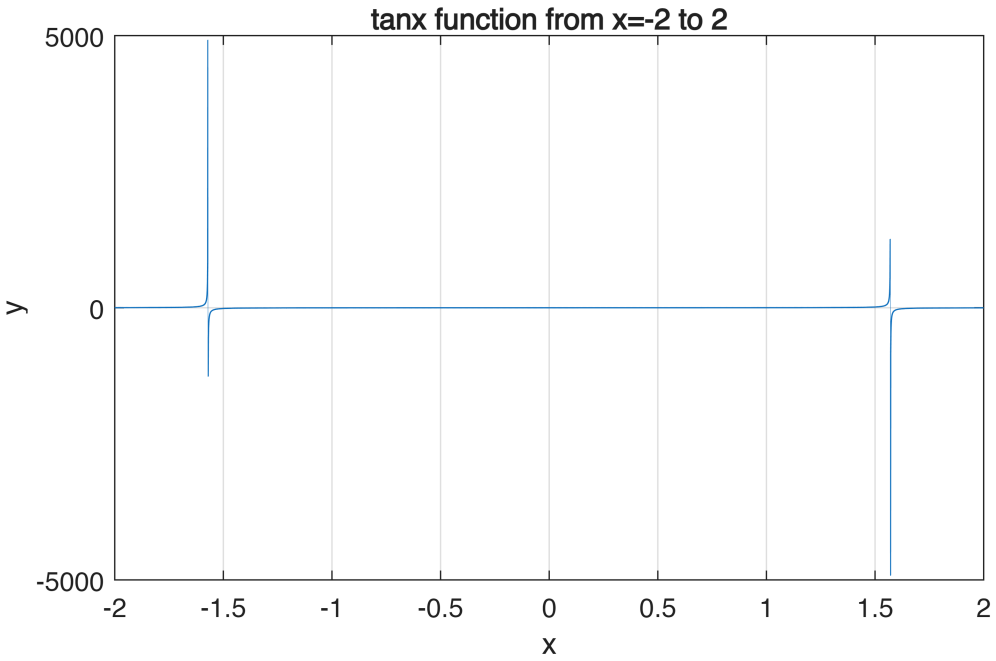
excercise: Labwork 3

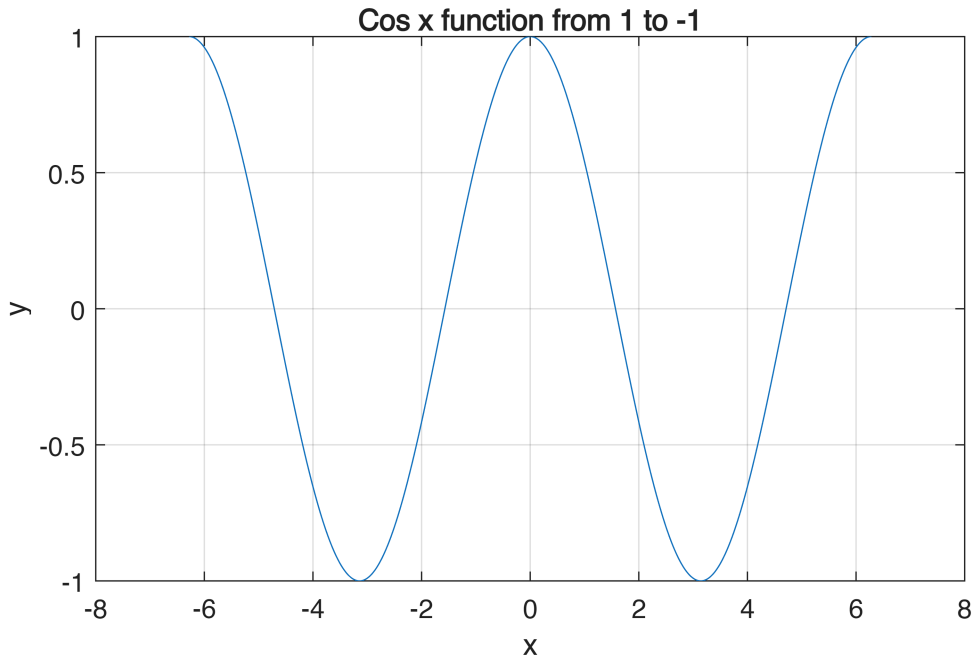
```
%QNo 1
x = -2*pi:0.001:2*pi;
plot(x, sin(x))
axis('equal')
xlabel('x')
ylabel('y')
grid on
title('sinx function from x=-2*pi to x=2*pi')
```




```
%qno 2
x = -2:0.001:2;
plot(x, tan(x))
xlabel('x')
ylabel('y')
grid on
title('tanx function from x=-2 to 2')
```

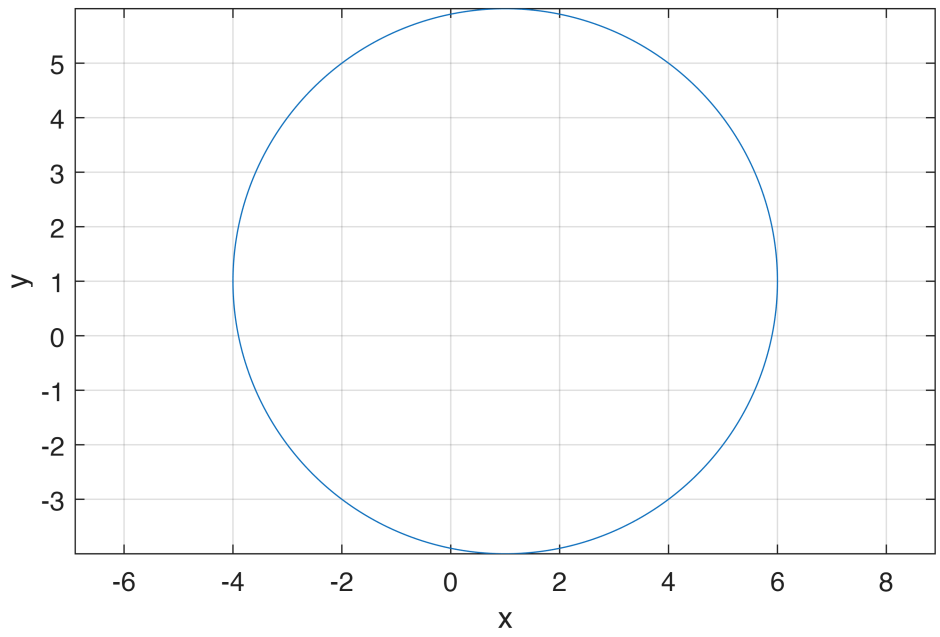



```
% extra QUESTION
x = -2*pi:0.0001:2*pi;
plot(x,cos(x))
xlabel('x')
ylabel('y')
grid on
title('Cos x function from 1 to -1')
```

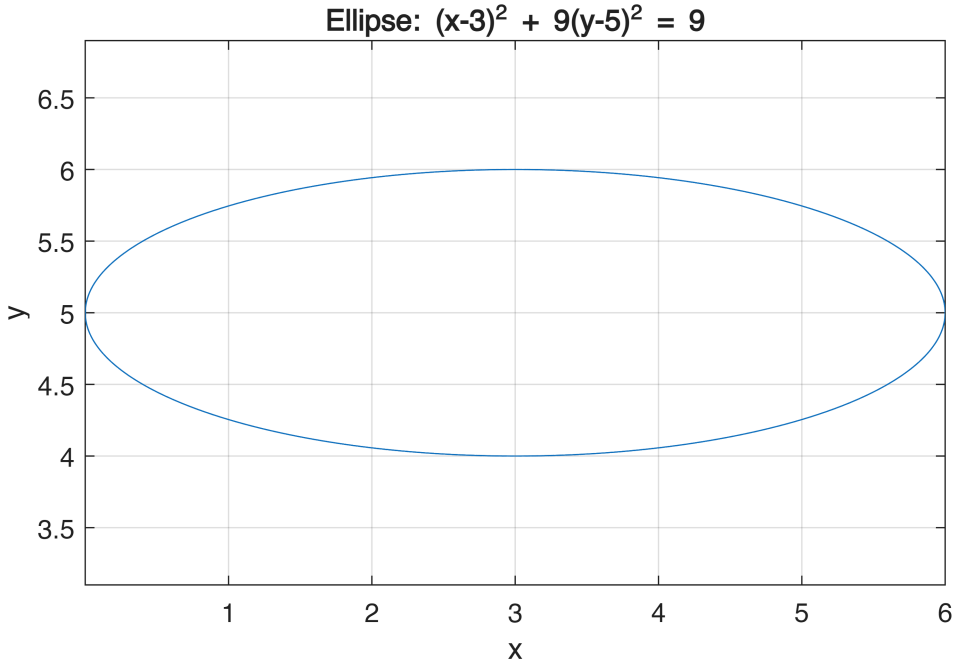



```
%Qno 3
```

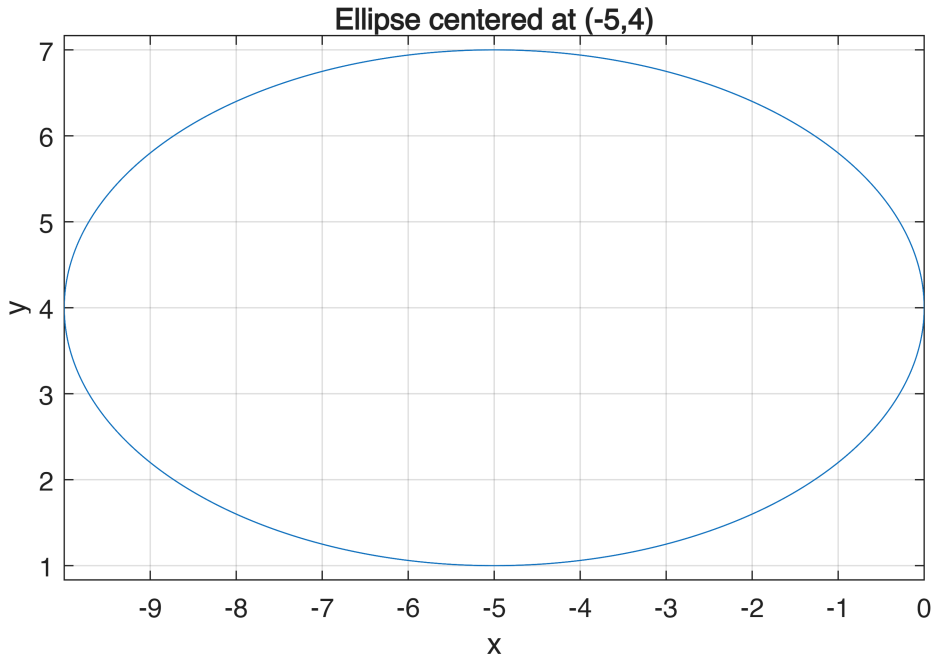
```
theta=linspace(0,2*pi,2000);
xc=1;
yc=1;
r=5;
x=xc+r*cos(theta);
y=yc+r*sin(theta);
plot(x, y)
axis equal
grid on
xlabel('x')
ylabel('y')
```



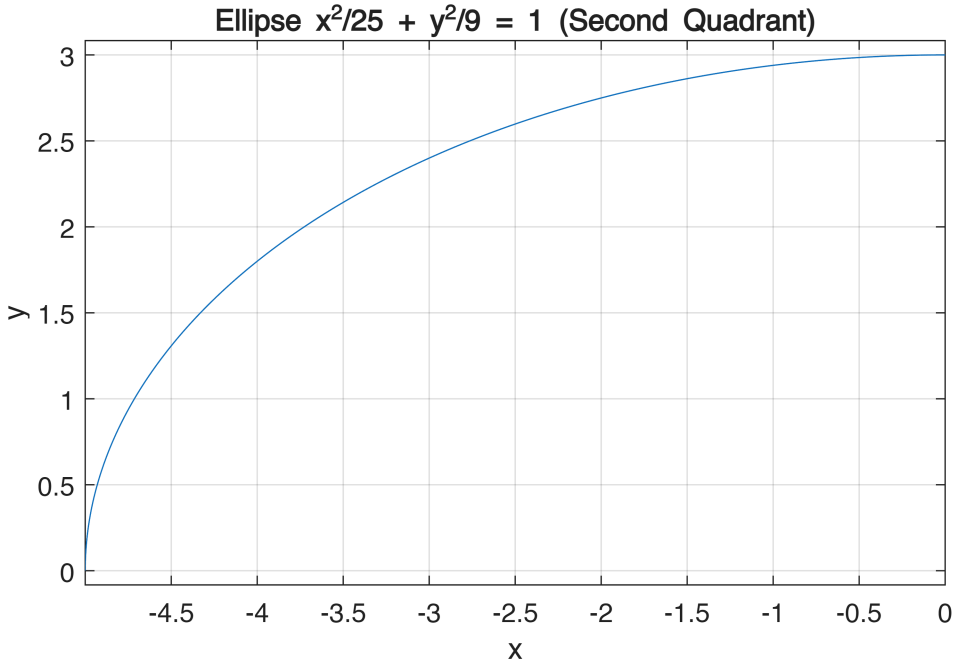

```
%Qno 4
xc=3; yc=5; a=3; b=1;
theta=0:0.0002:2*pi;
x=xc+a*cos(theta);
y=yc+b*sin(theta);
plot(x,y)
grid on
axis equal
ylabel('y')
xlabel('x')
title('Ellipse: (x-3)^2 + 9(y-5)^2 = 9')
```



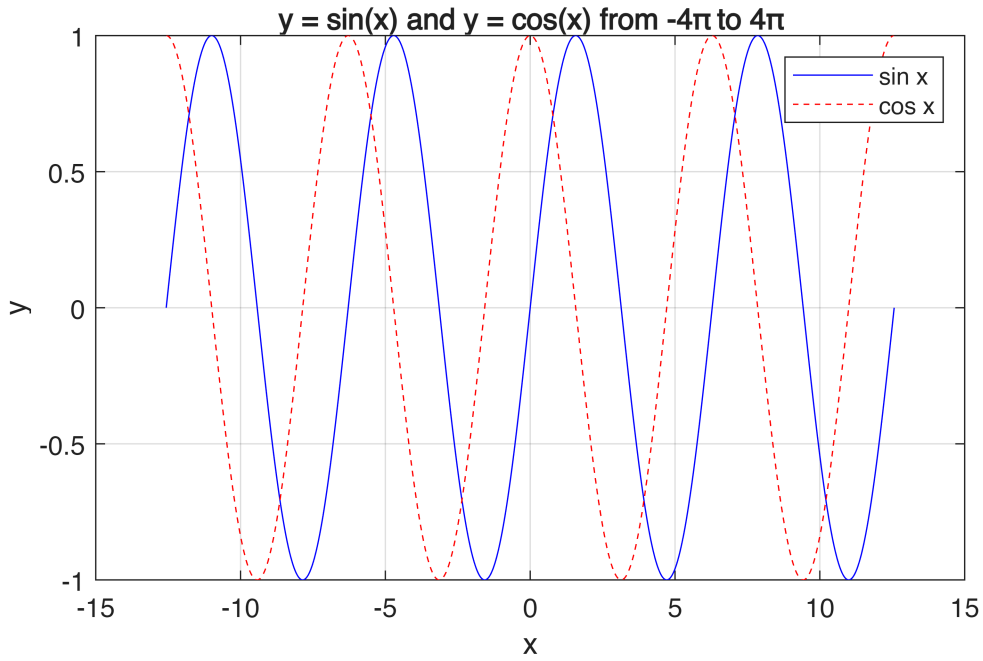

```
%qno 5 - Taking the whole ellipse in 2nd quadrant by assigning custom value
% we take the center of ellipse in 2nd quadrant

theta=0:0.0003:2*pi;
xc=-5; yc=4; a=5; b=3;
x= xc+a*cos(theta);
y= yc+b*sin(theta);
plot(x,y)
axis equal
xlabel('x')
ylabel('y')
grid on
title('Ellipse centered at (-5,4)')
```



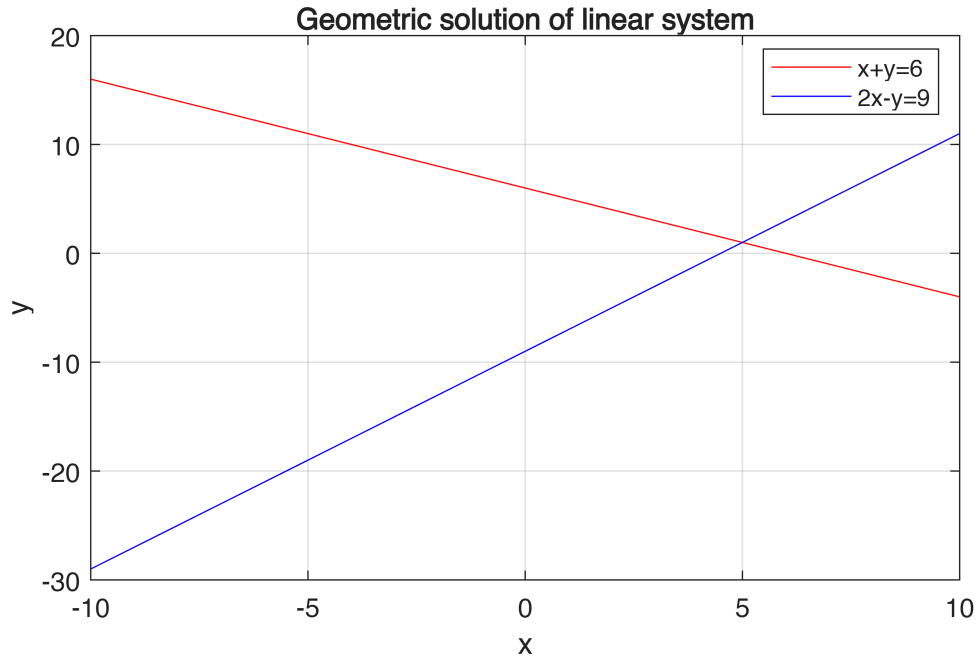

```
%qno 5 by using range to show its plot in only 2nd quadrant
theta=pi/2:0.0003:pi;
a=5; b=3;
x=a*cos(theta);
y=b*sin(theta);
plot(x,y)
axis equal
xlabel('x')
ylabel('y')
grid on
title('Ellipse x^2/25 + y^2/9 = 1 (Second Quadrant)')
```



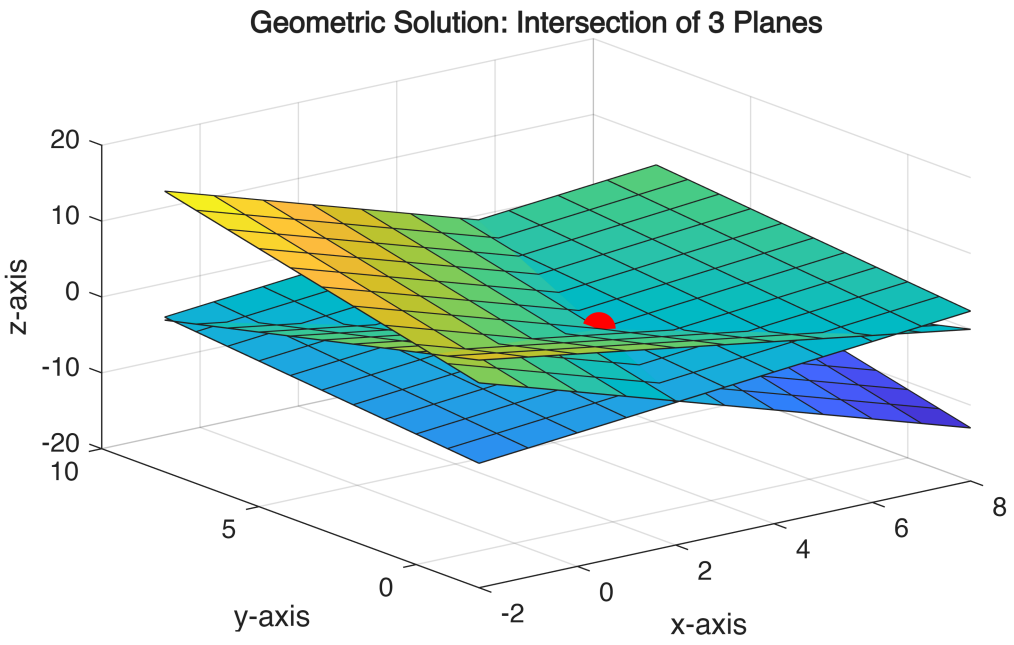

```
%qno 6
x= -4*pi:0.0001:4*pi;
plot(x,sin(x),'Color','blue','LineStyle','-')
hold on
plot(x,cos(x),'Color','red','LineStyle','--')
hold off
grid on
xlabel 'x'
ylabel 'y'
title('y = sin(x) and y = cos(x) from -4π to 4π')
legend('sin x','cos x')
```



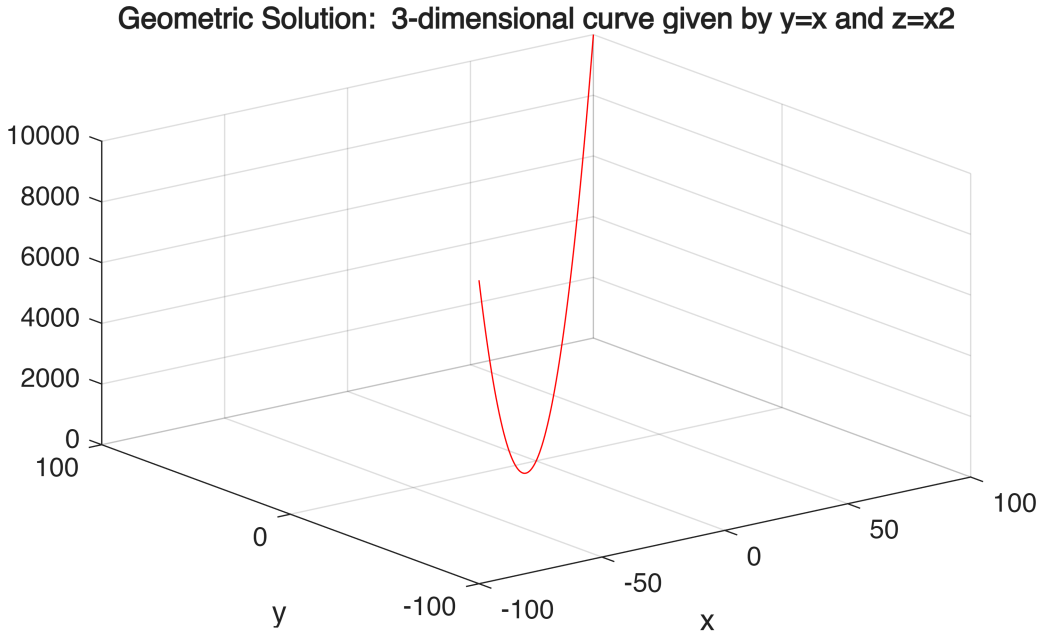

```
%qno 7
x=-10:0.0001:10;
y1=6-x;
y2=2*x-9;
plot(x,y1,'red')
hold on
plot(x,y2,'B')
hold off
grid on
xlabel 'x'
ylabel 'y'
legend('x+y=6','2x-y=9','location','best')
title('Geometric solution of linear system')
```




```
%qno 8
A = [1  1  1; 2 -1  1; 3  2 -5];
B = [6;5;8];
solution = A\B;
[x_grid,y_grid]=meshgrid(-2:1:8);
z1=6-x_grid-y_grid;
z2=5-2*x_grid+y_grid;
z3=(3*x_grid+2*y_grid-8)/5;

figure;
hold on;
surf(x_grid,y_grid,z1);
surf(x_grid,y_grid,z2);
surf(x_grid,y_grid,z3);
plot3(solution(1), solution(2), solution(3), 'ro', 'MarkerSize', 12,
'MarkerFaceColor', 'r');
title('Geometric Solution: Intersection of 3 Planes');
xlabel('x-axis');
ylabel('y-axis');
zlabel('z-axis');
grid on;
view(3);
hold off;
```

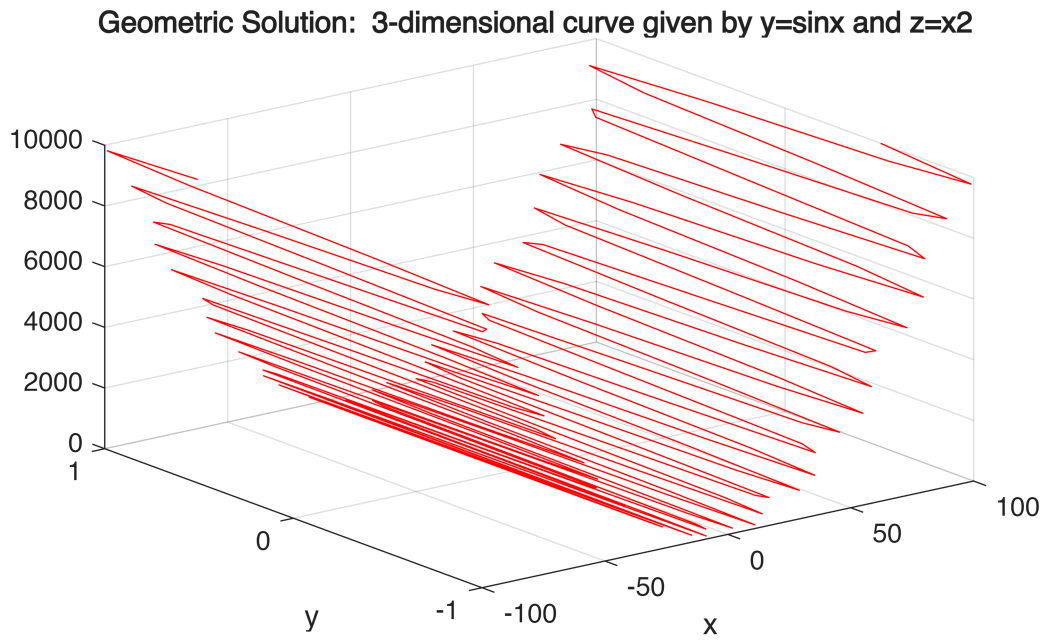



```
%qno 9
x=-100:1:100;
plot3(x,x,x.^2,'color','red')
grid on
xlabel 'x'
ylabel 'y'
title('Geometric Solution:  3-dimensional curve given by y=x and z=x2');
```



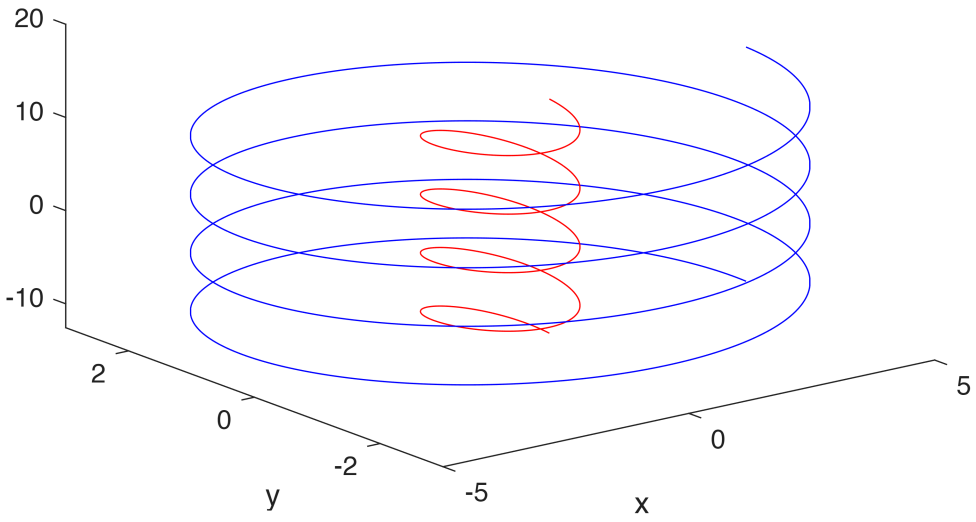

```
%qno 10
```

```
x=-100:1:100;
y=sin(x);
plot3(x,y,x.^2,'Color','red')
grid on
xlabel 'x'
ylabel 'y'
title('Geometric Solution:  3-dimensional curve given by y=sinx and z=x2 ');
```

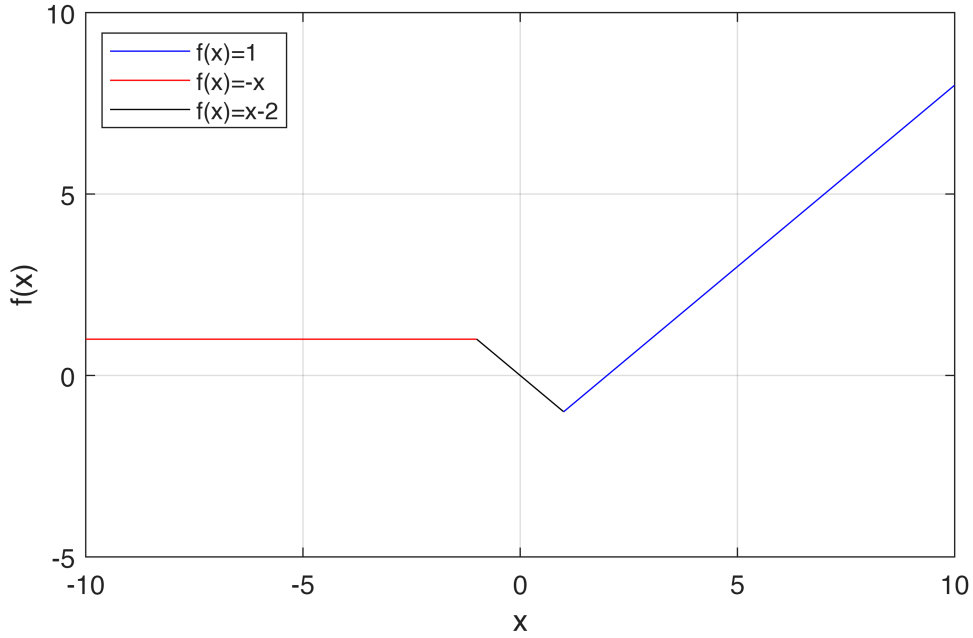



```
%qno 11
t=-4*pi:0.0001:4*pi;
plot3(5*cos(t),3*sin(t),t+1,'color','blue')
hold on
plot3(cos(t),sin(t),t,'color','red')
hold off
xlabel 'x'
ylabel 'y'
title('Geometric Solution: Plot the 3-dimensional elliptical helix');
```

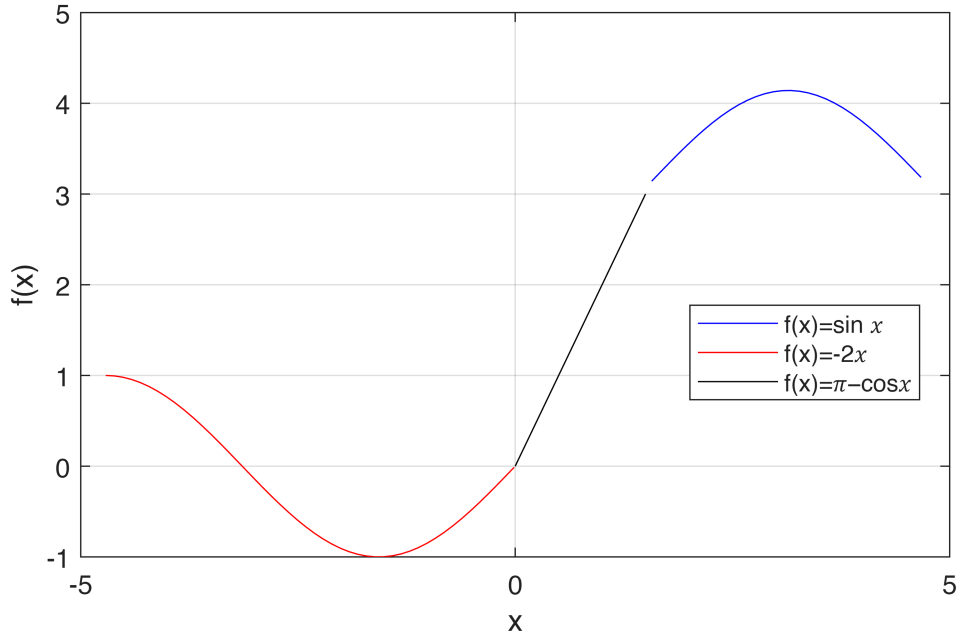
Geometric Solution: Plot the 3-dimensional elliptical helix



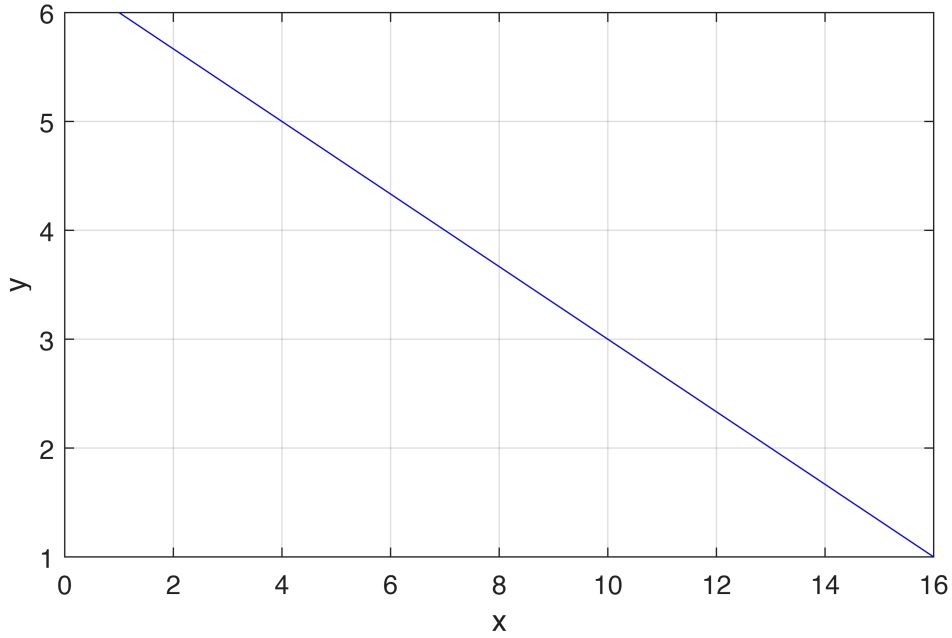

```
%qno 12
x1 = -10:0.1:-1;
x2 = -1:0.1:1;
x3 = 1:0.1:10;
y1=ones(size(x1));
y2=-x2;
y3=x3-2;
hold on
plot(x1,y1,'r');
plot(x2,y2,'black');
plot(x3,y3,'b');
xlabel 'x'
ylabel 'f(x)'
grid on
legend('f(x)=1','f(x)=-x','f(x)=x-2','Location','best');
hold off
axis([-10 10 -5 10])
```



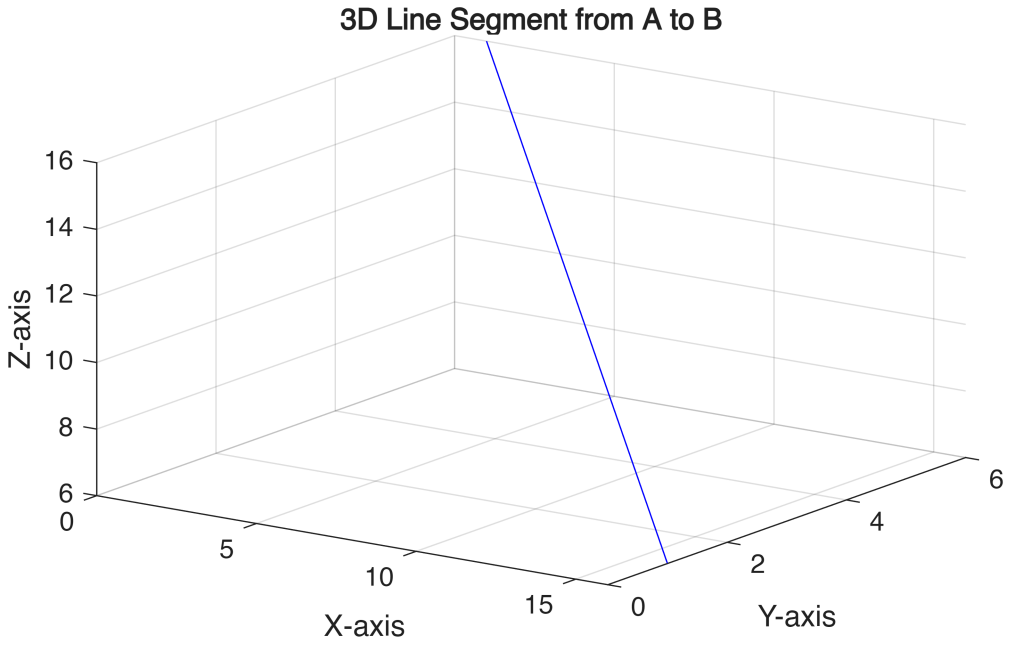

```
%qno 13
x1 = -3*pi/2:0.1:0;
x2 = 0:0.1:pi/2;
x3 = pi/2:0.1:3*pi/2;
y1=sin(x1);
y2=2*x2;
y3=pi-cos(x3);
hold on
plot(x1,y1,'r');
plot(x2,y2,'black');
plot(x3,y3,'b');
xlabel 'x'
ylabel 'f(x)'
grid on
legend('f(x)=sin ','f(x)=-2','f(x)=-cos','Location','best');
hold off
```




```
%qno 14 in 2D only x and y axis
x=16;
y=01;
z=06;
hold on
A=[x,y];
B=[y,z];
plot([A(1) B(1)], [A(2) B(2)],'Color','b');
xlabel 'x'
ylabel 'y'
grid on
```




```
%qno 14 in 3D x and y and z axis
x=16;
y=01;
z=06;
hold on
A=[x,y,z];
B=[y,z,x];
plot3([A(1) B(1)], [A(2) B(2)], [A(3) B(3)],'Color','b');
xlabel 'x'
ylabel 'y'
grid on
view(35,25);
xlabel('X-axis'); ylabel('Y-axis'); zlabel('Z-axis');
title('3D Line Segment from A to B');
hold off
```


3D Line Segment from A to B
Z-axis
16
14
12
10
8
6
0
5
10
15
X-axis
0
2
4
6
Y-axis